DETECTING OCEAN CURRENTS BY OBSERVING THEIR HYDROGEN-ION CONCENTRATION.

By ALFRED GOLDSBOROUGH MAYOR.

[Abstracted from Proceedings of the American Philosophical Society, Vol. 58, No. 2 pp. 150–160, 1919.]

The hydrogen-ion concentration of pure distilled water is about 10^{-7} grams per liter at 22° C. Sea water is alkaline, containing only about one-tenth this amount. The surface water of the equatorial drift of the Pacific contains a hydrogen-ion concentration of about 0.6021×0^{-8}; occasionally, however, there are found regions of water which is temporarily flowing eastward, and this is less alkaline, the concentration being sometimes as high as 0.83×10^{-8}. The easterly flowing water is also cooler, has a high oxygen content, and is strongly charged with CO_2 where as the tension of the CO_2 in the westward drift is about the same as that of the air above the sea. These easterly currents are due to upwelling of bottom water, due to local causes, such as the removal of the surface water by gusts in the trade winds.

The hydrogen-ion concentration is dependent chiefly upon the temperature, and not upon the salinity, of the water.

Similar studies support McEwen's theory of the upwelling of water along the abrupt slope of the Pacific coast of America, and Bigelow's demonstration of the same, but less marked, effect, off the shallow Atlantic seaboard.

In general, if no upwelling is taking place, the CO_2 of the sea water is always practically in balance with that in the air over the water; this balance is, in warm waters, brought about by the influence of photosynthesis by marine plants, and the escape of large quantities of CO_2 from the sea into the air is prevented, contrary to the opinions based upon the laboratory experiments of Henderson and Cohn. The colder surface waters of the globe are absorbing carbon dioxide, while the tropical regions are probably setting some of it free into the atmosphere, but on the whole a balance is probably maintained.

The detection of the sudden and marked change from alkaline water to relatively acid water when one encounters an easterly set in the tropical Pacific, or passes from a warm into a cold current, can be so easily made by means of the indicator thymolsulphonephthalein that this method may prove of value in navigation.

References to literature are given at the end of the paper.—*E. W. W.*

NOTES, ABSTRACTS AND REVIEWS.

ADDITIONAL NOTE ON THE INTERNATIONAL GEODETIC AND GEOPHYSICAL UNION.*

By Dr. L. A. BAUER.

The present convention is to continue for 12 years, beginning January 1, 1920, subject to renewal and modification at the end of this period. The general meetings are to take place every three years, when there will be opportunity for changes in organization or statutes as future experience may suggest. It will not be necessary for a Union to meet at the same place as the Council, or for all the various Unions to meet together. A section may, furthermore, call a special meeting when found necessary.

Objects of the International Geodetic and Geophysical Union.

The objects are stated in the official version, as follows:

1. To promote the study of problems concerned with the figure and physics of the earth.
2. To initiate and coordinate researches which depend upon international cooperation and to provide for their scientific discussion and publication.
3. To facilitate special researches such as the comparison of instruments used in different countries.

Section *c* (Meteorology), it was generally agreed, could usefully and effectively supplement, by confining its work to research and fundamental problems in meteorology, the functions and work of the prewar International Meteorological Committee. The latter, as it consisted of official weather bureau directors, necessarily had to concern itself, primarily, with administrative and official meteorological questions. In the unavoidable absence of the elected president, Sir Napier Shaw, no organization work was attempted except the passing of the two resolutions, to the following effect:

The hope is expressed—

(*a*) That there be appointed a Joint Committee of the International Astronomical Union and of the Section of Meteorology of the International Geodetic and Geophysical Union for investigational work on solar radiation;

(*b*) That international work in atmospheric electricity, as far as possible, be placed under the direction of a committee nominated partly by the Section of Terrestrial Magnetism and Electricity and partly by the Section of Meteorology.

With the organization of the Division of Foreign Relations of the National Research Council in Washington December 10 a means has been provided for active and well coordinated American effort in the international research organization.—ED.

* Complete notice is published in Terr. Mag. and Atmos. Elec., Sept. 1919, vol. 24, p. 105–112, and in Science, Oct. 31, 1919, p. 399–403. For previous notice see this REVIEW, July, 1919, pp. 449–450.

GOLD MEDAL TO PROF. HILDEBRANDSSON.

The Council of the Royal Meteorological Society has awarded the Symons memorial gold medal for 1920 to Prof. H. H. Hildebrandsson for distinguished work in connection with meteorological science.—Nature, London, November 27, 1919, page 340.

ATMOSPHERIC POLLUTION.[1]

[Abstract, reprinted from Science, New York, Nov. 28, 1919, p. 501.]

The advisory committee on atmospheric pollution has published its fourth report summing up the observations in the year 1917–18.

The full lists showing in detail the monthly deposit figures at various stations are not reproduced, inasmuch as these have been already published in the *Lancet;* but full returns from two stations, Newcastle and Malvern, are given; and these give the highest and lowest deposits.

Figures of total solids deposited monthly are given for all stations, 24 in number, the months being on a 30-day basis.

In many instances the rainfall as measured at these stations did not agree with the amount obtained by the official Meteorological Office gauges, but this is easily explained when it is remembered that the gauges of the committee are often on roofs and are thus elevated. The rainfall is given in millimeters, and it would be well if we in the United States would follow this example.

[1] Meteorological Office. Report on observations 1917–18. Advisory Committee on atmospheric pollution, London, 1919.